

**City University of Hong Kong  
Course Syllabus**

**offered by Department of Information Systems  
with effect from Semester A 2021/2022**

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**Part I Course Overview**

<b>Course Title:</b>	<u>Business Data Analytics</u>
<b>Course Code:</b>	<u>IS6400</u>
<b>Course Duration:</b>	<u>One Semester (13 weeks)</u>
<b>Credit Units:</b>	<u>3</u>
<b>Level:</b>	<u>P6</u>
<b>Medium of Instruction:</b>	<u>English</u>
<b>Medium of Assessment:</b>	<u>English</u>
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	<u>Basic knowledge on statistics</u>
<b>Precursors:</b> <i>(Course Code and Title)</i>	<u>Nil</u>
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	<u>Nil</u>
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	<u>Nil</u>

## Part II Course Details

### 1. Abstract

The course aims to teach students the process, models, and tools for data analysis and analytics in business, such as in finance, marketing, etc. The course will teach students the practical skills to employ software packages (such as spreadsheets and Python) and apply necessary packages (such as scikit-learn, statsmodels, tensorflow, etc.) to analytical framework and tackle business data analysis problems for corporation manage and decision making. On completion of the course students should be able to

- (a) understand the target and requirements of a selection of critical business data analysis problems.
- (b) manage the statistical techniques and machine learning models for data analytics.
- (c) implement the models into a programming language, such as Python, and adapt the models through Python packages, and
- (d) analyze and interpret the outputs of models to support decision making in finance, marketing, accounting, etc.

### 2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Describe the target and requirements for a spectrum of business data analysis problems in finance, marketing, etc.	25%	✓		
2.	Develop the ability to employ scripting and database tools to retrieve data and use spreadsheet and Python to discover patterns in data to address the selected problems.	35%	✓	✓	
3.	Creatively apply and adapt the introduced modeling techniques to propose original findings for practical organizational data analysis problems.	30%		✓	✓
4.	Creatively communicate analytical procedure and results effectively in presentations with oral, written and electronic formats.	10%		✓	✓
		100%			

A1: Attitude

*Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.*

A2: Ability

*Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.*

A3: Accomplishments

*Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.*

### 3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

Indicative of likely activities and tasks students will undertake to learn in this course. Final details will be provided to students in their first week of attendance in this course.

Lecture : 13 hours

Laboratory/Tutorial : 26 hours

TLA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
TLA1. Lecture	Explain the concepts, applications, and implications of a selection of business data analysis problems in finance, marketing, and so forth. Formulate the problems and Introduce statistics models and data analytics techniques to address them.	✓	✓	✓		
TLA2. Laboratory	Demonstrations by instructor and hands-on exercises by students on solving the selected business data analysis problems in finance, marketing, etc. Widely used Python packages will be used as a means to practice the modelling techniques learnt in lectures.	✓	✓	✓	✓	
TLA3. Group Project	Students would have to complete a group project to investigate a real-life case in finance, marketing, or other area and apply business data analytics techniques to address it.	✓	✓	✓	✓	

### 4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Indicative of likely activities and tasks students will undertake to learn in this course. Final details will be provided to students in their first week of attendance in this course.

Assessment Tasks/Activities	CILO No.				Weighting	Remarks
	1	2	3	4		
Continuous Assessment: 60%						
<b>AT1. Class performance and assignments</b> Involvement in class discussions reflect on the materials covered in the lecture; Attempt in laboratory exercises; and Efforts shown in addressing the data analysis assignments provided by the instructor.	✓	✓	✓	✓	30%	
<b>AT2. Group Project</b> A group project, which includes a written report and an oral presentation (about 10 min duration), will be assigned to students to investigate a real-life problem in business data analysis to critically apply the concepts learned in the course, and propose original findings. Each team will contain 4 to 6 students.	✓	✓	✓	✓	30%	
Examination: 40% (duration: one 2-hour exam)						
<b>AT3. Final Examination</b> The final exam is used to assess the student's competence in the taught subjects and will cover the readings assigned in class as well as the lectures, tutorials, and cases and examples mentioned in class.	✓	✓	✓		40%	
					100%	

Note: Students must pass BOTH coursework and examination in order to get an overall pass in this course.

## 5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
AT1. Class performance and assignments	Ability to show initiative and interactions in raising sensible questions and giving insightful discussion of issues relating to the course topics in class.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	Ability to demonstrate understanding of the course topics through assignments.	High	Significant	Moderate	Basic	Not even reaching marginal levels
AT2. Group Project	Ability to frame the problem to the models learned in the class and push the ability of the model to a high level in tackling the problem.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	Ability to contribute to the project and deal with issues in collaboration.	High	Significant	Moderate	Basic	Not even reaching marginal levels
AT3. Exam	Ability to provide good answers to exam questions.	High	Significant	Moderate	Basic	Not even reaching marginal levels

## Part III Other Information (more details can be provided separately in the teaching plan)

### 1. Keyword Syllabus

(An indication of the key topics of the course.)

- Introduction and Overview
  - Data analysis in finance, marketing, and other business applications
  - Business intelligence
  - Python for Business Data Analytics
- Techniques
  - Feature Engineering
  - Regression
  - Time Series Modelling
  - Association Analysis
  - Text Analytics
- Applications
  - Financial forecasting: Sales, revenue, and stock
  - Business intelligence in marketing: Census, segmentation & basket analysis
  - Text analytics: sentiment analysis, topic discovery
- Advanced topics
  - Model evaluation and selection
  - Deep learning methods

## 2. Reading List

### 2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Pang-Ning Tan; Michael Steinbach; Anuj Karpatne; Vipin Kumar, <i>Introduction to Data Mining</i> , Pearson, 2019.
2.	Aurélien Géron, <i>Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems</i> , O'Reilly Media, 2017.

### 2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	S. Christian Albright, and Wayne Winston, <i>Business Analytics: Data Analysis and Decision Making</i> , 5 <sup>th</sup> edition, Cengage Learning, 2015.
2.	Gordon S. Linoff, <i>Data Analysis Using SQL and Excel</i> , Wiley Pub., 2 <sup>nd</sup> edition, 2015.
3.	Viktor Mayer-Schönberger, Kenneth Cukier, <i>Big Data: A Revolution That Will Transform How We Live, Work, and Think</i> , Eamon Dolan/Houghton Mifflin Harcourt, 2013.
4.	John W. Foreman, <i>Data Smart: Using Data Science to Transform Information into Insight</i> , Wiley Pub, 2013.
5.	Timothy R. Mayes and Todd M. Shank, <i>Financial Analysis with Microsoft Excel</i> , South-Western College Pub, 2006.
6.	Jackson, M. and Staunton, M., <i>Advanced Modeling in Finance Using Excel and VBA</i> , Wiley Pub.
7.	Simon Benninga, <i>Financial Modeling</i> , MIT Press.

- Updated SYL template in July 2017.
- Updated Assessment Tasks (AT) in July 2018.
- Updated SYL content in February 2021